

**REMARKS**

The Applicants respectfully requests further examination and reconsideration in view of the above amendments and arguments set forth fully below. Claims 1-42 were previously pending in this application. Within the Office Action, Claims 6, 20-25 and 31-42 stand rejected, and Claims 1-5, 7-19 and 26-30 are objected to. The Applicants respectfully traverse this rejection. Further, in view of the above amendments, some of the rejections stated within the Office Actions are moot.

By the above amendment, Claims 20 and 35-38 have been canceled and Claims 1, 6-19 and 21-34 and 39-42 have been modified to comply with the objections raised within the Office Action. Prior Claims 31-42 have been renumbered as Claims 30-41. Accordingly, Claims 1-19, 21-33, and 38-41 are pending in the application.

**Objections to the Drawings**

Within the Office Action, the drawings are objected to under 37 CFR §1.83(a) for not showing every feature of the invention specified in the claims. Specifically, it is stated that the second and third capacitors of dependent Claim 15, lines 9-15 and the sixth capacitor of dependent Claim 16, lines 9-10 must be shown or the features canceled from the claims.

By the above amendments, the second and third capacitors of dependent Claim 15, lines 9-15 have been canceled from the claims, and --sixth capacitor-- of dependent Claim 16, lines 9-10 has been amended to read --second capacitor--. Applicants respectfully submit that the second capacitor of dependent Claim 16, lines 9-10 shown in FIG. 5, C4.

**Objections to the Claims**

Within the Office Action, Claims 1, 6-21 and 26-34 are subject to a number of objections. The Applicants respectfully submit their appreciation and thanks for the time taken by the Examiner in detailing the specific objections to the Claims. A majority of the recommendations stated within the Office Action have been incorporated into the Claims by the above amendments. However, several of the recommendations have not been incorporated. For example, in the objection to Claim 1, line 20 it is stated that --third-- should be --second--. The Applicants respectfully traverse this objection and submit that the third inductor of Claim 1 is shown as L3 in FIG. 3. In other cases, the Applicants have followed the spirit of the recommendations but have chosen different language. In all cases, the Applicants believe that by

the above amendments all Claim limitations have antecedent basis both within the Claims and within the specification.

Also within the Office Action, the Claims 31-42 have been objected to for not being in accordance with 37 CFR §1.126 because there is no claim 30 in the latest preliminary amendment. The Claims have been amended to reflect the renumbering of Claims 31-42 as Claims 30-41 by the Examiner.

**Rejections under 35 U.S.C. §112**

Within the Office Action, Claims 22-25 and 31-42 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. Specifically, it is stated in the Office Action that the limitation “the first input transistor” lacks antecedent basis in the Claims 22-25 and 31-42. By the above amendment, the Claims 22-25 and 31-42 and their respective base claims have been amended so that every limitation in the Claims has sufficient antecedent basis.

**Rejections under 35 U.S.C. §102**

Within the Office Action, Claims 6 and 21-23 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Number 6,308,058 to Souetinov et al (hereinafter Souetinov). Specifically, it is stated within the Office Action that column 2, lines 32-57; column 3, lines 21-57; and column 4, lines 20-41 are relevant to independent Claims 6 and 21. The Applicants respectfully traverse this rejection.

Souetinov discloses an image reject mixer circuit arrangement comprising an input amplifier connected to first and second phase-splitters, the phase-splitters each having two substantially complementary outputs, a first mixer core arranged to mix two of said phase-splitter outputs with a local oscillator signal and a second mixer core arranged to mix the other two of said phase splitter outputs with a phase shifted local oscillator signal. The image reject mixer further comprises an input stage connected to the phase splitter stages in a cascode configuration. However, nowhere does Souetinov disclose a low noise RF input circuit coupled to the mixer core through a folded cascode circuit, the low noise RF input circuit coupled to receive an RF input signal, wherein the folded cascode circuit further isolates the RF input circuit from the LO drive signal and the plurality of harmonics.

In contrast to the teachings of Souetinov, the mixer circuit of the present invention is a single ended input to a double balanced high dynamic range mixer using a folded cascode

topology with only two base-emitter junctions across the supply. It provides for the use of bondwires to off chip ground as DC block and DC feed elements. The single ended input and differential output balanced mixer is well suited for the input stage of an integrated radio receiver - off chip circuitry is usually single ended, but on chip circuits are usually differential. No off chip differential RF circuits or baluns are required which reduces off chip component count and improves radio performance. The mixer circuit has lower LO drive requirements because of the DC coupled LO port. This results in better radio performance and a smaller die area because of the DC coupled IF port. (Present Invention, Abstract) As described above, Durec does not teach a low noise RF input circuit coupled to the mixer core through a folded cascode circuit, the low noise RF input circuit coupled to receive an RF input signal, wherein the folded cascode circuit further isolates the RF input circuit from the LO drive signal and the plurality of harmonics.

The independent claim 6 is directed to a mixer circuit for generating an IF output responsive to an RF input and a LO device source including a mixer core having a doubly balanced mixer with a first differentially coupled npn transistor pair and a second differentially coupled npn transistor pair, the mixer core coupled to receive a LO drive signal, the LO drive signal having a plurality of harmonics, and a low noise RF input circuit coupled to the mixer core through a folded cascade circuit, the low noise RF input circuit coupled to receive an RF input signal, wherein the folded cascode circuit further isolates the RF input circuit from the LO drive signal and the plurality of harmonics. As described above, Souetinov does not teach a low noise RF input circuit coupled to the mixer core through a folded cascode circuit. For at least these reasons, the independent claim 6 is allowable over the teachings of Souetinov.

Claims 22 and 23 are dependent on the independent Claim 6. As described above, the independent Claim 6 is allowable over the teachings of Souetinov. Accordingly, Claims 22 and 23 are also allowable as being dependent on an allowable base claim.

The independent claim 21 is directed to a mixer circuit for generating an IF output responsive to an RF input and a LO drive source including a mixer core having a doubly balanced mixer including a first differentially coupled npn transistor pair and a second differentially coupled npn transistor pair, the mixer core coupled to receive a LO drive signal, the LO drive signal having a plurality of harmonics, and a low noise single ended RF input circuit coupled to the mixer core through a folded cascode circuit, the low noise RF input circuit coupled to receive an RF input signal, wherein the cascode circuit further isolates the RF input circuit from the LO drive signal and the plurality of harmonics the RF circuit including means for providing an input impedance and means for splitting a phase of the RF signal. As described

above, Souetinov does not teach a low noise single ended RF input circuit coupled to the mixer core through a folded cascode circuit and means for splitting a phase of the RF signal. For at least these reasons, the independent claim 21 is allowable over the teachings of Souetinov.

**Rejections under 35 U.S.C. §103**

Within the Office Action, Claim 24 is rejected under 35 U.S.C. § 103(a) as being anticipated by Souetinov. Specifically, it is stated within the Office Action that Souetinov discloses a mixer circuit according to Claim 6 wherein the first differentially coupled transistor pair, the second differentially coupled transistor pair and the first input transistor are all FET transistors. Further, it states that it is obvious to one skilled in the art for all transistors to be MOSFET transistors because they are one type of FET transistor. While the Applicants find no problems with this latter statement, the Applicants respectfully traverse the contention that Souetinov discloses a mixer circuit according to Claim 6 for the reasons discussed above.

Further, Claim 24 is dependent on the independent Claim 6. As described above, the independent Claim 6 is allowable over the teachings of Souetinov. Accordingly, Claim 24 is also allowable as being dependent on an allowable base claim.

**Regarding Allowable Subject Matter**

Within the Office Action it is stated that Claims 1, 13 and 14 would be allowable if rewritten to overcome the claim objections above. By the above amendments, Claims 1, 13 and 14 have been rewritten to overcome the claim objections, as described above. Accordingly, Claims 1, 13 and 14 are all in condition for allowance.

It is further stated that Claims 15 and 16 would be allowable if rewritten to overcome the drawing objection and the claim objections above and to include all of the limitations of the base claim, the base claim also rewritten to overcome the claim objections and any intervening claims, the intervening also rewritten to overcome the claim objections. By the above amendments, Claims 15 and 16 have been rewritten to overcome the drawing objection and the claim objections, as described above. Also, Claims 15 and 16 both depend from the independent Claim 15, which has been rewritten to overcome the claim objections as described above. However, the Applicants respectfully traverse the requirement that Claims 15 and 16 be rewritten to include all of the limitations of the base claim and any intervening Claims. Instead, because Claims 15 and 16 depend from Claim 14, which is allowable as discussed above, Claims 15 and 16 are

allowable as being dependent on an allowable base claim. Accordingly, Claims 15 and 16 are all in condition for allowance.

Also within the Office Action, it is stated that Claims 7-12, 17-19, and 26-29 would be allowable if rewritten to overcome the claim objections set forth and to include all of the limitations of the base claim, the base claim also rewritten to overcome the claim objections, and any intervening claims, the intervening claims also rewritten to overcome the claim objections. By the above amendments, Claims 7-12, 17-19, and 26-29 have been rewritten to overcome the claim objections, as described above. However, the Applicants respectfully traverse the requirement that Claims 7-12, 17-19, and 26-29 be rewritten to include all of the limitations of the base claim and any intervening Claims. Instead, because Claims 7-12 depend from Claim 6, Claims 17-19 depend from Claim 14, and Claims 26-29 depend from Claim 13, and because Claims 6, 13 and 14 are all allowable as discussed above, Claims 7-12, 17-19, and 26-29 are allowable as being dependent on an allowable base claim. Accordingly, Claims 7-12, 17-19, and 26-29 are all in condition for allowance.

Further, within the Office Action it is stated that Claims 31-34 would be allowable if rewritten to overcome the rejections under 35 U.S.C. §112, second paragraph and to overcome the claim objections above and to include all of the limitations of the base claim and any intervening claims. By the above amendments, Claims 31-34 have been rewritten to overcome the claim objections, as described above, and are now numbered as Claims 30-33. However, the Applicants respectfully traverse the requirement that Claims 31-34 be rewritten to include all of the limitations of the base claim and any intervening Claims. Instead, because Claims 31-34 depend from Claim 14, which is allowable as discussed above, Claims 31-34 are allowable as being dependent on an allowable base claim. Accordingly, Claims 31-34 are all in condition for allowance.

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Applicants respectfully submit that the claims, as amended, are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,  
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CERTIFICATE OF MAILING (37 CFR § 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the U.S. Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to the: Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450

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Date: 1-18-05

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